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Govt. II-27—100,000—22-2-48.

Development (1951) Department

M SERIES.

G.O. No. 1524

Dated 27-3-1951

[Despatch Abstract.]

Agriculture - Indian Central Coconut Committee - Schemes financed by the Committee - Progress reports for the half-year ending 31st December 1947 - Forwarded.

DEVELOPMENT DEPARTMENT.

Letter Ms.No. 1524, dated 27-3-1948.

To

The Secretary to the
Indian Central Coconut Committee,
Ernakulam.

Sir,

Sub: Agriculture - Indian Central Coconut Committee - Schemes financed by the Committee - Progress reports for the half year ending 31st December'47 forwarded.

Ref: Your telegram No. F.35-(3)/45,dated 17th March 48.

I am directed to forward herewith 35 printed copies of the progress reports of the following schemes for the half year ending 31-12-1947.

(1) Coconut Nursery Schemes in East Godavari, Tanjore and Malabar Districts.

(2) Scheme of Research on coconuts in Madras Province.

Yours obedient servant,

Sd. x x x
Secy. to Government.

Copy to Director of Agriculture.

PROGRESS REPORT....

p.t.o.

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INDIAN CENTRAL COCONUT COMMITTEE.

COCONUT NURSERY SCHEMES IN EAST GODAVARI, TANJORE AND MALABAR DISTRICTS IN MADRAS PRESIDENCY.

REPORT OF WORK DONE FOR THE HALF-YEAR ENDING 31ST DECEMBER 1947 (1st JULY TO 31ST DECEMBER 1947).

Section A.--INTRODUCTION.

1. DATE OF SANCTION.--The scheme for the establishment of Government coconut nurseries at the Agricultural Research Station, Samalkot for East Godavari district and Pattukottai for Tanjore district in Madras Presidency, from 1st January 1946 was sanctioned by the Government of Madras in G.O.Ms. No. 4756, Development, dated 29th November 1945, with reference to letter No. F.35-(1)/45, dated 8th October 1945, of the Secretary, Indian Central Coconut Committee. The scheme for running a coconut nursery for South Malabar at the Agricultural Research Station, Pattambi, was sanctioned by the Indian Central Coconut Committee in their letter No.F. 35-(9)/45 dated 20th August 1947 and by the Madras Government in G.O.Ms.No. 3173, Development, dated 22nd July 1947.

2. DATE OF COMMENCEMENT AND DURATION.-- The schemes have been sanctioned for a period of five years from the date of commencement. The scheme was commenced on 1st January 1946 at Pattukottai and Samalkot and on 1st September 1947 at Pattambi.

3. FINANCE.--(i) SANCTIONED AMOUNT.--The amounts sanctioned for the schemes for the full period of five years are shown below:--

	Pattukottai and Samalkot scheme. Rs.	Pattambi scheme. Rs.
Pay of staff	15,072	12,020
Allowances,	9,100	5,420
Other charges	31,590	16,875
Total	55,762	34,315

The total recurring expenditure is to be met by the Indian Central Coconut Committee and the Provincial Government on 50:50 basis. The Committee have agreed to the Provincial Government taking full credit for the receipts realized from the scheme provided they meet all non-recurring expendes and sell the seedlings to the growers at a cost not exceeding four annas per seedling.

The amounts sanctioned for the different years (1st April to 31st March) are given below:

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	Pattukottai and Samalkot scheme.	Pattambi scheme.
	Rs.	Rs.
1945-46 ...	3,008	...
1946-47 ...	10,158	...
1947-48 ...	11,500	3,645
1948-49 ...	12,310	7,581
1949-50 ...	11,756	7,383
1950-51 ...	7,030	7,285
1951-52 ...	...	6,325
1952-53 ...		2,096
Total...	55,762	34,315

(ii) EXPENDITURE.--The expenditure incurred on the schemes from its inception to 31st December 1947 is given below:

	Pattukottai and Samalkot scheme.	Pattambi scheme.
	Rs.	Rs.
1945-46 (1st January to 31st March 1946)	2,799	...
1946-47 (1st April 1946 to 31st March 1947).	9,541	...
1947-48 (1st April 1947 to 31st December 1947)	8,164	746

4. STAFF.--The schemes are worked under the control and guidance of the Oilseeds Specialist, Coimbatore (Madras) by the following staff, one Assistant and one Fieldman being posted to each of the three nurseries, viz., Samalkot, Pattukottai and Pattambi:-;

Designation.	Scale of pay.	Sanctioned strength.
Assistant	Rs.100--5--140-E.B.--10--220	3
Fieldmen	Rs. 45--2---55--1--60	3

The Assistants had an intensive course of training in coconut nursery management at the Agricultural(Coconut) Research Stations on the West Coast before they were posted to the respective centres of nursery work.

5. OBJECT:-- As the coconut is a perennial tree which lives up to an age of over 80 years, it is very important that only seedlings of approved quality that would ultimately give economic yields are planted. The demand for such selected seedlings has been consistently high every year. But it has not been possible to meet this demand to any great extent from the existing Government coconut nursery at Nileshwar in South Kanara district. There are also no established coconut nurserymen in this Province who can be relied upon to supply good quality seedlings. The objective of the scheme is therefore to produce and supply the public with selected seedlings on a large scale (about 5,000 seedlings per year) and at a cheap rate by starting Government coconut nurseries in the important cononut tracts of this Province. This ~~exp~~ is expected to eliminate

the possibility of the ryots planting inferior seedlings which would in the long run result in low and uneconomic yields of coconuts.

6. VENUE OF WORK.--The coconut nursery schemes are being worked at the Agricultural Research Station, Samalkot, in East Godavari district, at the Agricultural Research Station, Pattukottai, in the Tanjore district and at the Agricultural Research Station, Pattambi, in South Malabar.

SECTION B.---PROGRAMME OF WORK.

1. SELECTION OF PARENT TREES.--The different taluks of East Godavari, Tanjore and Malabar which are noted for coconut cultivation and production will be intensively toured with a view to locate parent trees which are suitable for propagation. In selecting the trees, the criteria already established will be followed scrupulously. Particular attention will be paid to the following aspects:--

(i) The trees will, as far as possible, be selected in disease free gardens which contain a fairly high percentage of desirable palms.

(ii) The palms selected for propagation will be middle-aged with compact spherical crowns and will have large number of leaves with short and stout petioles.

(iii) Only regular and heavy bearing trees with round or pheroid-medium-sized nuts having thick kernel, with short and stout peduncle (flower stalk) which does not buckle will be selected as parent trees.

(iv) Trees producing barren nuts or those that shed the nuts will not be selected as parent trees.

A record of yield performance of the selected trees will be maintained from year to year.

2. SELECTION OF SEEDNUTS.-- Seednuts intended for raising seedlings will be selected from bunches maturing in the summer months, viz., January to June every year. The bunches will be harvested periodically when the nuts are fully mature (twelve months from the date of opening of the flower). Ill-developed nuts and those showing unhealthy signs or not having water inside will be rejected. The selected seednuts will be duly numbered and despatched to the nursery sites in sealed bags and stored in sand in a cool and shady place at least for a month before they are planted in the nursery beds. The seednuts before despatch will be treated with 1 percent Bordeaux mixture as a prophylactic measure.

3. RAISING THE NURSERY.--Nursery beds of convenient size will be formed with sand in a suitable place near an irrigation source. The nuts grouped accordint to the locality will be planted vertically with the stalk end up with proper spacing in the beginning of the monsoon rains in June-August. Hand-watering will be done regularly to ensure good germination and proper growth of seedlings. The nursery will be mulched with dry grass or the seedlings shaded according to necessity during the hot months.

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4. NURSERY STUDIES.--Observations on date of germination of individual seednuts and rate of production of leaves, total number of leaves produced, splitting of leaflets, girth at collar, height of seedlings, and general condition of individual seedlings will be recorded with a view to selection.

5. DISTRIBUTION OF SELECTED SEEDLINGS.--Seedlings considered fit for propagation based on the nursery studies will be supplied to the coconut growers in East Godavari, Tanjore, Malabar and adjoining districts based on indents received in advance. Complete information on spacing and care and management of coconut planations will be furnished to the growers at the time of supply of seedlings. As far as possible growers will be advised to raise large plantations of coconuts instead of in small isolated patches so that the holding may prove economic in the long run. The complete record of indent and supply of seedlings will be maintained with a view to watch the progress and performance of the seedlings supplied from the nursery.

SECTION C.--RESULTS.

This report gives an account of the work done in the coconut nursery schemes during the half-year ending 31st December 1947.

2. SEASON AND RAINFALL.--The rainfall during the period under report was in excess of the normal at Samalkot and proved beneficial to the coconut seedlings in the nursery. At Pattukottai the north-east monsoon was a complete failure and the nursery had to be post-watered frequently. Want of sufficient moisture in the soil at Pattambi due to the failure of the north-east monsoon handicapped the preparation of nursery beds for the ensuing year.

3. ITEMS OF WORK DONE--(i) SELECTION OF PARENT TREES.--

The Coconut Nursery Assistants toured the important coconut tracts of the districts for noting the general performance of the parent trees already selected last year and also to mark out fresh parent trees, for gathering seednuts during the coming season. The criteria established for the selection of parent trees, and seednuts were scrupulously adhered to. The number of parent trees marked out so far in the different centres is furnished below:--

Name of centre.	Number of trees selected.
East Godavari district.	
1. Tatipaka	9
2. Vadrevupalle	11
3. Appenapalle	99
4. Kodurupadu	75
5. Bodasakurupalem	16
6. Indupalle	13
7. Gangalakuru	32
8. Ambajipeta	15
9. Machavaram	8
10. Munganda	44
11. Palivela	13
12. Kothapeta	27
13. Penkulapatigaruvu	21
Total	383

Name of Centre.	Number of trees selected.	Name of Centre.	No. of trees selected
	TANJORE DISTRICT.		
1. Adirampatnam	40	6. Alangadu.	225
2.Naduvikadu	52	7. Milarikkadu	20
3. Maravakadu	107	8. Sundaram	54
4. Manjavayal	9	9. Jambuvanodai	114
5. Muthupet	101	0. Kallurnikadu	46
		Total	768
	MALABAR DISTRICT.		
1. Chowghat	235	6. Kulirmala	48
2. Palai	66	7. Kakkoth	119
3. Guruvayoor	136		
4. Punnayurkulam	24	Total	720
5. Andathode	92		

(ii) SELECTION OF SEEDNUTS.--The number of seednuts procured till 30th June 1947 for raising 1947 nursery was already reported in the Annual Report for 1946-47. Seednuts gathered during the period under report at the different centres are given below:--

	Samalkot.	Pattukottai.
Total number of seednuts gathered up to 30th June 1947-for 1947 nursery	6,540	4,996
Total number of seednuts purchased after 30th June for 1947 nursery.	1,285	3,318
Total	7,825	8,314

(iii) RAISING THE NURSERY.--The seednuts after purchase were brought to the nursery centres and preserved in sand for a minimum period of a month before they were planted in the nursery. At the time of planting, the seednuts were individually examined and the nuts which did not contain water in them or were otherwise unsuitable were rejected. The number of selected seednuts actually planted at the different centres in the 1947 nursery is furnished below:--

Samalkot	7,50
Pattukottai	7,733

The nursery beds of 1946 and 1947 plantings were regularly watered during rainless days. At Samalkot there was a light incidence of NEPHANTIS SERINOPA and termites..Timely control measures brought them under check.

iv) NURSERY STUDIES.---The nurseries were regularly observed for noting the date of germination of the seednuts. Observations on the rate of production of leaves, total number of leaves produced, splitting of leaflets, firth at collar and height of seedlings were made regularly for all the seedlings in the 1946 nursery. The seedlings were protected against pests and diseases till they were pulled out and despatched. A prophylactic spray of 1 percent Bordeaux mixture was given to all seedlings before the supply was effected.

(v) DISTRIBUTION OF SELECTED SEEDLINGS.--Based on nursery studies seedlings were marked out for supply. The rejected seedlings were pulled out and destroyed. The number of seedlings supplied from Samalkot and Pattukottai from 1946 nursery is given below:--

Samalkot	1,879
Pattukottai	3,783

p.t.o.

The outturn of selected seedlings came to about 72 per-cent of the seednuts sown in the nursery at Samalkot and 78 per cent at Pattukottai.

In additionx to this 7,556 seedlings irom the Provincial nursery at Nileshwar were also distributed to the growers of the Province.

The seedlings raised at the Government coconut nurseries continue to be very propular among the coconut growers and large number of indents for selected seedlings are being received. Advance indents for 6,480 seedlings from the Pattukottai and 7,608 from the Samalkot nurseries have already been received and registered for supply during 1948.

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A revised Coconut Nursery Scheme for the whole Province with eight nurseries, one each at Nileshwar, Pattambi, Coimbatore, Pattukottai, Aduthurai, Samalkot, Maruteru and Anakapalle to supply about 160,000 selected seedlings every year has been prepared and submitted to the Indian Central Coconut Committee. The scheme has been approved by the Committee and is awaiting the final sanction of the Madras Government.

4. PROPAGANDA.--The coconut nursery staff during their tours in the districts for the purpose of selecting parent trees and harvesting seednuts, contacted as large a number of ryots as possible and advised them on all aspects of raising and management of coconut plantations with particularx xf reference to the spacing to be adopted in planting, the manures to be applied, inter-cultivation to be given, the measures to be taken to control the different pests and diseases, etc. A very large number of enquiries on coconut cultivation were also received by post and they were replied to promptly. The Departmental leaflet on "Coconut cultivation" continues to be in great demand.

Agricultural Research Institute,
Lawley Road P.O., Coimbatore,
25th January 1948.

C.M. JOHN,
OILSEEDS SPECIALIST.

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INDIAN CENTRAL COCONUT COMMITTEE.

SCHEME OF RESEARCH ON COCONUTS, MADRAS PROVINCE.

REPORT OF WORK DONE DURING THE HALF-YEAR ENDING 31ST DECEMBER 1947 (1ST JULY TO 31ST DECEMBER 1947).

SECTION. A.--INTRODUCTION.

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1. DATE OF SANCTION OF THE SCHEME.--The Secretary to the Indian Council of Agricultural Research communicated the Council's sanction of the original five-year Scheme of Research on Coconuts in the Madras Presidency in his letter No.F.120-23/35-A, dated 6th May 1938, and the Government of Madras sanctioned the inception of the scheme in G.O.Ms.No. 1704, Development, dated 14th July 1938. The Indian Council of Agricultural Research sanctioned the extension of the scheme in their letter No.F.31-15-41.A,dated the 17th November 1942; the Government of Madras sanctioned the extension of the scheme in G.O.Ms.No. 2531, Development, dated 2nd December'4

2. DATE OF COMMENCEMENT AND THE PERIOD OF THE SCHEME,-- The original five-year scheme of research sanctioned by the Indian Council of Agricultural Research was started on 15th September 1938, and terminated on 14th September 1943. The Extension Scheme was started from 15th September 1943 and is due to end on 31st March 1952.

3. FINANCE--(i) SANCTIONED AMOUNT.--The original five-year scheme was financed wholly by the Indian Council of Agricultural Research and the amount sanctioned for the scheme was Rs.43,040. For the extension Scheme, the Indian Council of Agricultural Research sanctioned only Rs.20,300 being the pay and travelling allowance of the Superintendent in the scheme for the period from 15th September 1943 to 31st March 1949, on the condition that the Madras Government met all other expenditure and continued to work the scheme up to 31st March 1952. For this purpose, the Government of Madras have sanctioned Rs.53,445 for the period from 15th September 1943 to 31st March 1952. Thus, the total amount sanctioned for the scheme since its inception (a) by the Council is Rs.63,340 and (b) by the Provincial Government is Rs.53,445. The liability of the Indian Council of Agricultural Research in regard to the Extension Scheme was taken over by the Indian Central Coconut Committee from 1st January 1946, as per letter No.F.20/45,dated 1st October'45, from the Secretary, Indian Central Coconut Committee.

The total amount sanctioned for the different years (1st April to 31st March) for the Extension Scheme is as follows:--

	Rs.
1942--43 ...	6,000 (for land acquisition,etc.).
1943--44 ...	4,480
1944--45 ...	8,800
1945--46 ...	10,100
1946--47 ...	10,300
1947--48 ...	10,200

(ii) . . . .

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(ii) EXPENDITURE.--The expenditure incurred by the Indian Council of Agricultural Research on the original five-year scheme till 14th September 1943 is Rs.42,654 and that incurred on the Extension Scheme from 15th September 1943 to 31st December 1945 is Rs.8,799. The expenditure incurred by the Provincial Government on the Extension Scheme up to the end of December 1947 is Rs.29,977 and that incurred by the Indian Central Coconut Committee up to the end of December is Rs.8,289.

The expenditure on the Extension Scheme for the different years is as follows:--

Year	Indian Council of Agricultural Research.	Indian Central Coconut Committee.	Provincial Government.
	Rs.	Rs.	
15th September 1943 to 30th June 1944.	2,235	...	6,358(cost of land etc.)
1st July 1944 to 30th June 1945.	4,431	...	3,631
1st July to 31st December 1945.	2,133	...	5,109
1st January to 30th June 1946	...	1,469	5,389
1st July 1946 to 30th June 1947	...	4,459	6,026
1st July to 31st December 1947	...	2,361	3,464
Total	8,799	8,289	29,977

4. STAFF.--The scheme is worked under the control and guidance of the Oil-seeds Specialist, Coimbatore (Madras), with the following staff:--

Designation.	Sanctioned strength.	Scale of pay. Rs.
Superintendent	1	230--30/2--260--40/2--500--50/2--700.
Assistant	1	100--5--140--E.B.--10--220.
Fieldman	1	45--2--55--1--60.
Clerk.	1	45--3--60--2--90.

5. OBJECT OF THE SCHEME.--The scheme envisages the investigation of certain economic and practical problems connected with the coconut. The aim of the scheme as extended is to establish criteria for the selection of seedlings that would ultimately give good yields, to investigate into the causes of shedding of buttons (young nuts) in the coconut and to study the quality and quantity of fibre obtained from coconut husks of different stages of maturity.

SECTION B.--TECHNICAL PROGRAMME.

ITEM 1--STUDY OF THE PERFORMANCE AS ADULT TREES OF THE SEEDLINGS RAISED FROM NUTS OBTAINED FROM DIFFERENT TYPES OF PALMS BY THE THREE METHODS OF POLLINATION, VIZ., 'SELF', 'NATURAL' AND 'CROSS'.--After the seedling studies contemplated in item I of the technical porgramme of the original five-year scheme are completed about 600 selected seedlings representing different treatments will be planted out to study

their future performance as adult trees. The actual number of seedlings to be selected and the method of layout to be adopted for planting them out will be decided in consultation with the Statistician to the Indian Council of Agricultural Research.

The newly planted materials will be studied individually for the following characters:--

(i) Rate of Production and shedding of leaves.
(ii) Number of leaves in the crown
(iii) Length of leaves and petiole.
(iv) Progressive girth and height of stem.
(v) Time of first flowering.
(vi) Rate of production of inflorescences
(vii) Production of female flowers.
(viii) Setting percentage.
(ix) Yield of nuts.
(x) Quality and quantity of copra.
(xi) Oil and free fatty acid content of copra.
(xii) Vigour, incidence of pests and diseases.

These characters will be utilized for comparing the relative performance of the young trees. They will also be correlated with the seedling characters as well as the characters of the parent trees from which they are obtained.

ITEM 2.--BUTTON SHEDDING.--The shedding of female flowers or the young nuts, will be observed in all the inflorescences produced consecutively for three years in five selected trees belonging to each of the following five yield groups of trees of the ordinary or tall variety:--

Trees producing	over 100	nuts per annum.
-do-	from 81--100	" "
-do-	61--80	" "
-do-	41--60	" "
	40 nuts and below.	

Data regarding button shedding will be recorded from time to time till nuts are properly developed and will be analysed in relation to yield of trees, month of pro- - duction of inflorescence (season), and age of buttons, The study will be extended to the following six varieties in addition to the ordinary or tall variety: (1) Laccadive, (2) Dwarf, (3) New Guinea, (4) Cochin-China, (5) Philippines and (6) Straits Settlements. Anatomical studies on the structures of the ovule and connected tissued including nectaries in the shed and unshed buttons will also be undertaken to find out the causes of button shedding.

ITEM 3--THE SUITABILITY OF HUSKS OBTAINED FROM NUTS OF DIFFERENT STAGES OF MATURITY FOR MAKING OF COIR FIBRE.--The nuts will be harvested when they are 9, 10, 11 and 12 months old. The husks will be retted and the outturn of fibre, its quality and colour, will be determined as also the tensile strength and resistance to decay of coir yarn made from fibre under various treatments. There will be three periods of retting, viz., 6, 9 and 12 months for each age group. There will be five replications with a minimum of not less than 50 nuts (husks) for each treatment.

SECTION C. ....

p.t.o.

SECTION C.--RESULTS.

PART I-- SUMMARY.

PROGRESS MADE FROM YEAR TO YEAR AND THE RESULTS ACHIEVED TO DATE---ITEM I -- STUDY OF THE PERFORMANCE AS ADULT TREES OF THE SEEDLINGS RAISED FROM NUTS OBTAINED FROM DIFFERENT TYPES OF PALMS BY THE THREE METHODS OF POLLINATION, VIZ., 'SELF,' 'NATURAL' AND 'CROSS'.--'Self', 'natural' and 'cross' pollination was done on trees belonging to six yield groups, viz., (1) trees yielding over 120 nuts per tree, per annum, (2) trees yielding from 101--120, (3) from 81--100, (4) from 61--80, (5) from 41--60 and (6) 40 nuts and below. The nuts obtained were planted and the seedlings studied in detail in the nursery under the original five-year scheme. The study of the seedlings in the nursery showed that selfed seedlings and also those obtained from low yielding parent trees were the least vigorous. After completing the study in the nursery, the seedlings were planted out in September 1942 in a replicated layout in a newly acquired area at Nileshwar for studying their performance as adult trees under the Extension Scheme.

The young palms were observed individually for the various vegetative characters relating to growth. Judged from the data of vegetative characters so far gathered, it is found that seedlings obtained by 'self' pollination are poorer or less vigorous than 'crosses' or 'naturals.' Also there is indication that seedlings obtained from low yielding parent trees particularly those yielding 40 and below 40 nuts per tree, per year, are less vigorous than those from higher yielding parents.

Observations on the various vegetative characters as well as on the production spadices in individual palms were continued to be made and recorded. It was found that 22 experimental palms and two border or non-experimental palms have produced spathes for the first time during the period under report. The observations are in progress and the data will be analysed during the next half-year and the results reported in the annual report for 1947-48..

ITEM 2--BUTTON SHEDDING.--Twenty-five trees of the ordinary tall variety comprising of five different yield-groups ranging from below 40 to above 100 nuts per tree, per year, and also two trees in each of six important world varieties were selected in September 1943, with a view to study the nature of shedding of buttons in relation to varieties, seasons, etc. Observations were in progress on the two sets of trees for the past three years. Age of buttons(young nuts) at the time of shedding, condition of buttons shed, periodicity of the shedding, etc., were some of the observations recorded.

The data gathered have shown that--

(i) periodicity of shedding of buttons is almost similar in all the varieties under study. There is very little shedding before stigmatic receptivity of the female flowers; most of the shedding takes place within six weeks after stigmatic receptivity; shedding is maximum from the second to the fourth week of stigmatic receptivity;

ii)....

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(ii) in the low yielding trees, shedding is very rapid during the first fortnight of stigmatic receptivity unlike in the high yielders;

(iii) about a third of the total number of buttons shed by the ordinary tall variety appears to be unfertilized and the unfertilized buttons completed the period of shedding earlier than the others;

(iv) appreciable differences are observed in the total production and shedding of buttons in the different years, the difference being more pronounced in the world varieties than in the ordinary variety of coconut;

(v) periodicity of shedding is, however, similar in the different years;

(vi) in the world varities, about 75 per cent of the buttons shed appears to be non-fertilized;

(vii) the percentage of buttons shed due to insect attack is negligible;

(viii) maximum shedding of buttons takes place during the rainy season and minimum during the cold season;

(ix) shedding of buttons, presumably unfertilized is also maximum during the rainy months;

(x) shedding is rapid during the hot months and the period of shedding is more spread out during the cold months.

(xi) in the ordinary tall variety there are no appreciable differences in the percentage of shedding buttons among trees of the different yield groups. The sequence of shedding of buttons is also almost the same in all the yield groups.

(xii) in all the yield groups of trees, shedding is high during the south-west monsoon season, and is low during cold season.

(xiii) in all the yield groups together 30.5 percent of the shed buttons are found to have more than one cell developed in the ovary (presumably unfertilised);

(xiv) in the last yield group, viz., trees producing 40 and below, 40 nuts per tree, per year, 16 per cent of the shed buttons do not show the presence of any cell in the ovary.

The preliminary observations were completed. Anatomical investigation to find out the structural differences in the shed and unshed buttons will be taken up.

ITEM 3--THE SUITABILITY OF HUSKS OBTAINED FROM NUTS OF DIFFERENT STAGES OF MATURITY FOR THE MANUFACTURE OF COIR FIBRE.-- Retting trials conducted under the original five-year scheme did not give conclusive results as regards the outturn of coir fibre obtained from husks of different ages. The trials were repeated as item 3 of the extension scheme. Retting was done during 1944-45 with husks obtained from 9, 10, 11 and 12 months old nuts (fr m the time of pollination) and adopting three levels or periods for retting. It was found that the outturn fibre from the 12 and 11 months old husks was more than-

than that from the ninemm months old husks, the outturn of fibre from 10 months old husks being on a par with that of 12 and 11 months. As regards colour of fibre; the trials have conclusively proved that 10 and 11 months old husks yield the best fibre of pleasing yellow colour. Also from the point of view of length of individual fibres and tensile strength, the fibre from 10 and 11 months old husks was found definitely superior to the rest. It was, thus, concluded that 10 and 11 months old husks were the best suited for coir making. Eleven months old nuts are, however, to be preferred as the loss in the quantity of copra in this case is much less than in ten months old nuts. It was fxxxdxkhxx also found that the period of retting did not influence the outturn of fibre in the different age groups. Retting for a period of nine months was found to be the optimdm period required for the proper retting of the husks by the 'open method' of retting.

RESISTANCE TO DECAY STUDIES.--Coir yarn made out of the fibres obtained from the retting trials during the original five-year scheme was subjected to the following treatments and studied for resistance to decay in terms of tensile strength: (1) Immersed in sea water, (2) immersed in fresh water, (3) exposed to sun and rain and (4) kept in shade (control). Tensile strength of yarn samples was determined at intervals of three, six, nine and twelve months of kx the treatments. It was found that exposing the yarn to sun and rain caused the maximum reduction in tensile strength, Gradual weakening of the yarn was particularly noticed at the period of the treatment (exposure to sun and rain) was prolonged. The tensile strength of yarn kept in sea water was found to remain unimpaired for nearly nine months.

The study was repeated with the fibre obtained from the retting trials under item 3. The results of analysis of the data have shown that--

(i) tensilee strength is not affected by the period of retting of the husks;

(ii) reduction in tensile strength is lowest in the yarn kept in shade while it is maximum in the yarn exposed to sun and rain; and

(iii) the longer the period of the treatment the greater is the decay.

These conclusions are x in conformity with the findings of the previous years. The experiments have, thus, been completed in 1946-47, and discontinued.

PART II- DETAILED REPORT.

This report gives an account of the work done during the half-year ending 31st December 1947. This is the fifty year of the workingsx of the extension scheme. Details regarding commencement of the scheme, finance, technical programme and the summary of work done so far are furnished in Sections A, B and C---Part I of the report.

2. SEASON AND RAINFALL.--118.78 inches of rain was received during the south-west monsoon of 1947. The quantity received during the period was about normal as compared with the five-year average of 111.67 inches; but the rainfall was heavy in August-September 1947 when

when 24.73 inches of rain was recorded as against 5.41 inches, received during the same period in the previous year and a five-year average of 7.35 inches.

The north-east monsoon in 1947 was weak and the rains were not evenly distributed. The total quantity of rain received till the end of December 1947 amounted to only 11.25 inches distributed over ten rainy days as against a rainfall of 19.86 inches distributed over 24 rainy days received during the same period in the previous year. The rains, however, were beneficial to the cocoanut crop.

Details of rainfall received till the end of December 1947 are furnished in the rainfall statement in Table I.

TABLE I.--RAINFALL STATEMENT--
AGRICULTURAL RESEARCH STATION, NILESHWAR.

Season.	Period.	1947-48. Rainfall in inches.	1947-48. No of rainy days.	1946-47 Rainfall in inches.	Average for the past five years. No. of rainy days.	Average for the past five years. Rainfall in inches.	Average for the past five years. No. of rainy days.
South-West Monsoon.	June 7th to 27th	15.5[illegible]	16	37.75	21	33.06	20.0
	June 28th to July 25th	38.75	24	50.64	27	45.11	26.8
	July 26th to August 20th	39.87	28	48.03	31	26.15	26.2
	August 30th to September 26th.	24.73	26	5.41	11	7.35	12.8
	Total	118.78	94.	141.83	90	111.67	85.8
North-East Monsoon.	September, 27th, to 31st October.	5,83	7	8.26	10	6.12	10.6
	November 1st to 28th.	2.47	1	6.99	9	7.63	6.4
	November 29th to December 26th.	2.95	2	4.61	5	1.34	2.2
	December 27th to 31st.	..	....	.	...	..	..
	Total	11.25	10	19.81	24	15.09	19.2

3. MANURING AND CULTIVATION.--A green manure crop of CROTALARIA STRIATA was grown in the entire experimental area in May-June 1947. Cultivator was worked at the time of sowing to cover the seeds of the green manure crop. Ash was applied broadcast at the rate of 20 lbs. per palm in August-September 1947. The green manure crop was cut and buried in November-December 1947, in shallow trenches dug on either side of seedling pits. Along with the green leafs, groundnut cake at 5 lb. and ammonium sulphate at ½ lb. per seedling were also applied to the young palms. The entire area was ploughed with 'Nonsoon' plough in December 1947 after the application of the manures.

CROTALARIA STRIATA isolated at the coconut stations is a useful green manure crop particularly suited for the cocoanut plantations.

4. FILLING UP OF GAPS.--Forty-four palms which died ....

died due to the very excessive rains received in 1946, were replaced with similar seedlings in October 1947, in addition to the eleven seedlings replaced last year. Arrangements have been made to replace the other dead seedlings also.

The seedlings used for filling up gaps were shaded against the sun and watered as and when necessary.

All the young palms were regularly searched for the rhinoceros bettle and the SERINOPA pests and also for bud-rot disease. The palms are all in good condition.

5. ITEMS OF RESEARCH--ITEM I--STUDY OF THE PERFORMANCE AS ADULT TREES OF THE SEEDLINGS RAISED FROM NUTS OBTAINED FROM DIFFERENT TYPES OF PALMS BY THE THREE METHODS OF POLLINATION, VIZ., 'SELF', 'NATURAL' AND 'CROSS'.--This item of the technical programme contemplates the study of seedlings obtained by 'self', 'natural' and 'cross' pollination from parent trees of six yield groups. The seedlings under the different treatments, after study in the nursery were planted in September 1942, with a view to study their future performance as adult trees.

The young palms are under observation for the various vegetative character relating to growth from the time of planting. Characters such as leaf production, leaf length, number of leaflets, etc., of the palms are being studied, and records maintained for individual palms. The data on the vegetative characters will be utilized to judge the vigour of the young palms under the different treatments. Judged from the data on the vegetative characters so far gathered it was found that seedlings obtained by 'self' pollination and from the parent trees of the lowest yield groups, were poorer than the others. The collection of the current year's data is in progress. They will be analysed when the data are completed and the results will be reported in the annual report for the year 1947-48.

FLOWERING.--Observations on the production of spadices were also being made on all the palms under study. During the period under report, 24 palms have commenced producing spadices for the first time. The details of the palms which have produced spathes are furnished in Table II.

TABLE II.--PROGENY PALMS PLANTED IN SEPTEMBER 1942 -- NUMBER FLOWERED IN 1947.

Yield group of the parent tree.	Experimental palms.				
	Natural.	Cross.	Self.	Borders.	Total.
(1)	(2)	(3)	(4)	(5)	(6)
Trees yielding above 120 nuts per tree, per year.	...	2	3	..	5
Trees yielding between 101-120 per tree per year.	1	2	3	..	6
Trees yielding between 81-100 per tree per year	1	1	1	1	4

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Item (1)	(2)	(3)	(4)	(5)	(6)
Trees yielding between 61-80 per tree per year	2	1	2	1	6
Trees yielding between 41-60 per tree per year	3	..			3
Trees yielding 40 and below 40 nuts per tree per year.	..	..	..	..	..
Total	7	6	9	2	24

It may be noted that none of the progeny palms belonging to the lowest yield group has put forth spathes so far. The palms have commenced producing spadices in about five years after transplanting. The spadices are peoduced in the 48th leaf axils, i.e., after the palms have produced on an average 48 leaves. Details like date of opening of spathe, number of female flowers produced, number of flowers set, number of good and barren nuts harvested will be recorded for the successive spadices of individual palms.

ITEM 2--BUTTON SHEDDING.--The shedding of buttons(young nuts) is of common occurrence in the coconut and is of great economic importance as it has a direct bearing on yield. The causes of shedding are not fully known. This item of study aims at the investigation of the causes of this phenomenon in the coconut.

With the a view to study the nature of shedding of buttons in relation to varieties periodicity of shedding age of buttons at the time of shedding, seasons, condition of shed buttons, etc, preliminary observations were made on a set of 25 trees of the ordinary or the tall variety and on 14 trees of seven important world varieties. The data gathered for a period of three years were examined and the observations made were reported in detail in the annual reports for 1944-45, 1945-46 and 1946-47.

The following findings will be helpful for the detailed investigation:--

(i) Maximum shedding takes place in the rainy months.

(ii) The critical stage of sheddings is after, and within four weeks of stigmatic receptivity.

(iii) Shedding due to mechanical injury caused by insects, for example, is negligible.

(iv) Maximum number (about 66 per cent) of buttons shed in the ordinary or tall variety is not probably due to want of pollination and fertilization of the female flowers.

Preliminary observations have been concluded. Anatomical investigation of shed and unshed buttons to study the possible causes of shedding will be taken up.

ITEM 3--- SUITABILITY OF HUSKS OBTAINED FROM NUTS OF DIFFERENT STAGES OF MATURITY FOR MANUFACTURE OF COIR FIBRE.--

Detailed study was made on the-

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the retting of husks of different stages of maturity and on the resistance to decay of yarn made out of the fibre obtained from the retted husks, and the results reported in the annual reports for 1945-46 and 1946-47. Since conclusive results were obtained the study was discontinued.

G.V. NARAYANA,
SUPERINTENDENT.

AGRICULTURAL RESEARCH INSTITUTE,)
LAWLEY ROAD P.O.,COIMBATORE,)
DATED THE 15TH JANUARY 1948.)

C.M. JOHN,
OILSEEDS SPECIALIST.

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Office Assistant,
Madras Record Office.

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